XVIII. *A Table for facilitating the Computations relative to Suspension Bridges.*

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THE following Table is supplementary to those accompanying the paper "On the Mathematical Theory of Suspension Bridges," printed in the Philosophical Transactions for 1826. It is deduced from the first Table there given, by the plain operations of common arithmetic; but this admits of a far more ready application than the former, to all cases of practical investigation.

The first column contains the deflections or versed sines of the curve, expressed in fractional parts of the double ordinate or Span. It is therefore $2y$ divided by x, and their reciprocals are added under each.

The second column gives the lengths of the chain without alteration from the former Table, except that the double ordinate or span is taken as the unit.

The third column has the tensions of the chain at the middle points or apices of the curve, when the tensions are least; taking the weight of the chain, or that weight augmented by the adjunct weight, or with the adventitious weight also, as unity. The numbers are obtained by dividing a by $2z$.

The fourth column gives the tensions in a similar manner for the extremities of the chain, where they are greatest; and it is made by dividing T by $2z$.

The fifth column gives the angles made by the chains at their extremities with the plane of the horizon, being the complements of those in the former Table.

As all these numbers are immediately derived from an existing Table, there would have been much additional trouble, and without any adequate advantage, in making the denominators of the fractions in the first column or their reciprocals (the decimal fractions), to succeed each other by equal differences. And I have thought it unnecessary to extend the Table further in either direction; since no deflection is likely to be so great as a seventh of the span;

and in the event of a short and light bridge being constructed with a deflection less than one part in forty, the columns may be continued with an accuracy quite sufficient, by taking the direct proportion of the denominators for columns three and four, and the inverse proportion for column five. The numbers in column two may be neglected, as not sensibly differing, in such a case, from unity, or they may be found in the Table from which this has been derived.

Deflections or Versed Sines.	Length of the Chains.	Tensions at the Middle Points.	Tensions at the Extremities.	Angles with the Horizon at the Extremities.
One in 39.97	1.00166	4.992	5.017	° ′ 5 43
.02502 39.17	1.00173	4.892	4.917	5 50
.02553 38.37	1.00181	4.791	4.817	5 58
.02607 37.57	1.00189	4.691	4.718	6 5
.02662 36.76	1.00196	4.591	4.618	6 13
.02720 35.96	1.00206	4.491	4.519	6 21
.02781 35.16	1.00215	4.391	4.419	6 30
.02844 34.36	1.00225	4.290	4.319	6 39
.02910 33.56	1.00236	4.190	4.220	6 48
.02980 32.76	1.00247	4.090	4.121	6 58
.03053 31.96	1.00260	3.989	4.021	7 9
.03129 31.16	1.00273	3.889	3.921	7 22
.03210 30.36	1.00288	3.789	3.822	7 31
.03294 29.56	1.00304	3.689	3.723	7 43
.03384 28.75	1.00322	3.588	3.623	7 56
.03478 27.95	1.00340	3.488	3.524	8 9
.03577 27.15	1.00360	3.388	3.425	8 24
.03683 26.35	1.00383	3.287	3.325	8 39
.03795 25.55	1.00407	3.187	3.226	8 55
.03914 24.75	1.00434	3.087	3.126	9 12
.04041				

TABLE (Continued).

Deflections or Versed Sines.	Length of the Chains.	Tensions at the Middle Points.	Tensions at the Extremities.	Angles with the Horizon at the Extremities.
One in 23.95 .04176	1.00463	2.986	3.027	° ′ 9 30
23.14 .04321	1.00496	2.886	2.928	9 50
22.34 .04476	1.00532	2.785	2.830	10 11
21.54 .04642	1.00568	2.685	2.731	10 33
20.74 .04823	1.00617	2.584	2.632	10 57
19.93 .05017	1.00668	2.483	2.533	11 23
19.13 .05227	1.00725	2.383	2.435	11 51
18.33 .05456	1.00789	2.282	2.337	12 22
17.52 .05706	1.00863	2.181	2.238	12 55
16.72 .05980	1.00947	2.080	2.140	13 31
15.92 .06282	1.01045	1.979	2.041	14 11
15.11 .06617	1.01158	1.878	1.943	14 54
14.31 .06989	1.01291	1.777	1.846	15 43
13.50 .07406	1.01448	1.676	1.749	16 28
12.70 .07876	1.01635	1.574	1.652	17 37
11.89 .08411	1.01862	1.473	1.555	18 45
11.08 .09024	1.02139	1.371	1.469	20 2
10.27 .09734	1.02484	1.269	1.363	21 31
9.47 .10563	1.02893	1.166	1.269	23 12
8.65 .11559	1.03474	1.063	1.174	25 11
7.84 .12762	1.04219	0.960	1.083	27 31
7.00 .14280	1.05343	0.854	0.990	30 20